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Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method of keeping a constant play back timing between a plurality of irregularly received information signal packets comprising a sequence of A/V information, the sequence including Program Clock Reference, the method comprising acts of:

determining a packet arrival time of each of the information signal packets using a packet arrival time counter derived from a local System Time Counter;

calculating a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference; and

subtracting the number of counts from the Program Clock Reference to derive a System Time Counter start value for the sequence.

2. (Currently amended) The method of claim 1, comprising acts of:

appending to the information signal packets, a corresponding Packet Arrival Time stamp, indicating the packet arrival time;

storing the received information signal packets with the appended Packet Arrival Time Stamps on a recording medium; and

storing an indication of the System Time Counter start value as an attribute of the stored received information signal packets with the appended Packet Arrival Time Stamps.

3. (Previously presented) A method of maintaining a constant play back timing between a plurality of irregularly received information

signal packets comprising a sequence of A/V information, the sequence including Program Clock Reference, the method comprising acts of:

running a time counter derived from a local System Time Counter to indicate a packet arrival time of each of the information signal packets;

locking the time counter to the retrieved Program Clock Reference;

retrieving information signal packets and their corresponding packet arrival time from a storage medium;

storing a number of retrieved information signal packets in a buffer;

outputting an information signal packet when its packet arrival time coincides with the time counter;

retrieving a System Time Counter start value from the storage medium, the System Time Counter start value is determined by calculating a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference and subtracting the number of counts from the Program Clock Reference to derive a start value; and

setting the System Time Counter with the retrieved System Time Counter start value.

4. (currently amended) The method of claim 3, further comprising an act of inserting Program Clock Reference information corresponding to the System Time Counter start value into the sequence of A/V information.

5. (currently amended) A method of maintaining a constant play back timing between a plurality of irregularly received information signal packets comprising a sequence of A/V information, the sequence including Program Clock Reference, the method comprising acts of:

running a presentation time counter derived from a local System Time Counter to indicate a packet arrival time of each of the information signal packets;

locking the presentation time counter to retrieved Program Clock Reference corresponding to either a first sequence or a second sequence of information signal packets comprising A/V information;

retrieving information signal packets and their corresponding packet arrival time from a storage medium;

storing a number of retrieved signal information packets and their corresponding packet arrival time;

presenting an information signal packet when its packet arrival time coincides with the presentation time counter;

subtracting a System Time Counter start value of the second sequence from a value of the Presentation Timestamp of a first information signal packet of the second sequence; and

setting the local System Time Counter to the value of the System Time Counter start value, the System Time Counter start value is determined by calculating a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference and subtracting the number of counts from the Program Clock Reference to derive a the System Time Counter start value.

6. (Canceled)

7. (currently amended) An apparatus for recording a real time sequence of information signal packets comprising A/V information, on a record carrier, the serial sequence comprising at intervals of multiple information signal packets, Program Clock Reference for locking a local System Time Counter with the Program Clock Reference , the apparatus comprising:

a receiver for receiving the information signal packets;

a time stamp generator for generating a time stamp corresponding to an arrival time of each of the information signal packets using a packet arrival time counter derived from a local System Time Counter; and

a writer for recording the generated time stamps and information signal packets on the record carrier, the time stamp generating means provided with a system time counter locked to the received program clock reference ; and

a processor for calculating a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference and subtracting the number of counts from the Program Clock Reference to derive a System Time Counter start value for the sequence.

8. (currently amended) An apparatus for reproducing a real time sequence of information signal packets comprising A/V information recorded on a record carrier, the apparatus comprising:

a reader for reading the information signal packets recorded and an indication of a System Time Counter start values from ~~en~~ the record carrier;

a storage device for temporarily storing a number of information signal packets read from the record carrier;

a time stamp generator comprising a Packet Arrival Time counter derived from a local System Time Counter to indicate a packet arrival time of each of the information signal packets, wherein the local System Time Counter for a sequence is initially set with the System Time Counter start value read from the storage device; and

a comparator for comparing a stored time stamp of an information signal packet with the generated Packet Arrival Time value and outputting an information signal packet from the storing means when a Packet Arrival Time Counter value coincides with the corresponding time stamp, ~~the System Time Counter start value is determined by calculating a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference and subtracting the number of counts from the Program Clock Reference to derive a start value.~~

9. (currently amended) A method of storing a real time sequence of information signal packets comprising A/V information, on a record carrier, the sequence comprising Program Clock Reference for locking a local System Time Counter (STC), Presentation Time Stamp information for determining the presentation time of the information comprised in the information signal packets, Decoding Time Stamp information for determining the decoding time of the information comprised in the information signal packets, and Packet Identification mapping information, the method comprising acts of:

- adding mark points at specific entry points in the sequence;
- at each specific entry point, storing the mark point and one

or more of the information entities selected from at least one of Program Clock Reference, Presentation Time Stamp information,

Decoding Time Stamp information, and Packet Identification mapping information,

~~wherein a packet arrival time of each of the information signal packets is determined using a packet arrival time counter derived from a local System Time Counter and a number of counts of the local System Time Clock Counter is calculated between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference.~~

10. (Previously presented) The method of claim 9, wherein the entry points include Iframes in an MPEG sequence of encoded frames.

11. (Previously presented) The method of claim 1, wherein the received sequence corresponds to a sequence of MPEG encoded frames.

12. (Previously presented) The method of claim 3, wherein the received sequence corresponds to a sequence of MPEG encoded frames.

13. (currently amended) A system for maintaining a constant play back timing between a plurality of irregularly received information signal packets comprising a sequence of A/V information, the sequence including Program Clock Reference, the system comprising:

a receiver that is configured to receive the sequence of information signal packets, the received sequence including, at intervals of multiple signal packets, program clock reference,

a timestamp generator that is configured to provide a packet arrival timestamp corresponding to each information signal packet,

a combiner that is configured to append the packet arrival timestamp to each corresponding information signal packet, and

a packet detector that is configured to detect a program clock reference value in a clock referencing information signal packet that includes program clock reference, and to determine a packet arrival time of each of the information signal packets using a packet arrival time counter derived from a local System Time Counter

wherein the timestamp generator is configured to provide a ~~system time~~System Time Counter start value based on the program clock reference value and a time difference between the clock referencing information signal packet and an initial information signal packet, and the combiner is configured to associate the System Time Counter ~~system start time value~~ with the sequence of information packets, and wherein a number of counts of the local System Time ~~Clock~~ Counter is calculated between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the Program Clock Reference; and the number of counts is subtracted from the Program Clock Reference to derive a System Time Counter start value for a sequence.

14. (currently amended) The system of claim 13, including a writer that is configured to write the sequence of information packets with appended packet arrival timestamps and associated ~~system~~ System Time Counter start time for the sequence to a recording medium.

15. (currently amended) The system of claim 14, wherein the sequence of information packets correspond to a sequence of MPEG-encoded packets, and the ~~system~~System Time Counter start time value is recorded as a segment attribute.

16. (Previously presented) The system of claim 13, wherein the timestamp generator includes an oscillator, a system counter, operably coupled to the oscillator, that is configured to provide a local clock reference, a phase detector that is configured to control an output of the oscillator based on a comparison of the local clock reference to the program clock reference value, and a packet timestamp generator, operably coupled to the output of the oscillator, that is configured to provide the packet arrival timestamps.

17. (Previously presented) A system for maintaining a constant play back timing between a plurality of irregularly received information signal packets comprising a sequence of A/V information, the sequence including Program Clock Reference, the system comprising:

- a reader that is configured to read a sequence of information packets and an associated system start time, each packet of the sequence of information packets including a corresponding packet arrival timestamp, and select packets including a program clock reference value,

- a buffer that is configured to store the sequence of information packets, and

- a controller that is configured to control an output of the buffer to provide the sequence of information packets in a time sequence that is dependent upon the system start time and the packet arrival timestamps,

- wherein the controller determines a packet arrival time of each of the information signal packets using a packet arrival time counter derived from a local System Time Counter, calculates a number of counts of the local System Time Clock Counter between the packet arrival time of the first information signal packet of the sequence and the information signal packet that includes the

Program Clock Reference; and subtract the number of counts from the Program Clock Reference to derive a start value.

18. (Previously presented) The system of claim 17, including a timestamp generator that is configured to provide a local timestamp for each information packet based on the system start time, wherein, the controller is configured to provide the output of the buffer based on a comparison of the local timestamp and the packet arrival timestamp of each information packet.

19. (Previously presented) The system of claim 18, including a demultiplexer, operably coupled to the controller and the timestamp generator, that is configured to extract the system start time, the program clock reference value, and the packet arrival timestamps from the sequence of information packets.

20. (Previously presented) The system of claim 18, wherein the timestamp generator includes an oscillator, a system counter, operably coupled to the oscillator, that is configured to provide a local clock reference, a phase detector that is configured to control an output of the oscillator based on a comparison of the local clock reference to the program clock reference value, and a packet timestamp generator, operably coupled to the output of the oscillator, that is configured to provide the local timestamps, wherein the controller is configured to set the system counter to an initial value corresponding to the system start time.

21. (Previously presented) The method of claim 5, wherein the first and second sequences correspond to sequences of MPEG-encoded frames.